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Steam-Air conversion of heavy oil in the presence of nanosized metal oxide particles

Petrov S., Kayukova G., Lakhova A., Soldatova R., Ibragimova D.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016 Springer Science+Business Media New York.The effect of suspended nanosized magnetite and hematite particles on the thermal degradation of heavy oil at 360°C in a steamair atmosphere was studied at various pressures. The highmolecularweight components of the oil were found to undergo degradation, leading to reduced oil viscosity. The effect of aluminum and zinc oxides used as additives to initiate hydrocarbon bond dissociation on this process was also investigated. The mechanisms for how change in composition components alters the conversion products relative to the initial oil were studied. Carrying out the process in the presence of additives at 11 MPa leads to reduced yield of aromatic end products with increased yield of oil hydrocarbons and the formation of gaseous products. Asphalticresin materials are also found to be reduced due to conversion in the presence of the additives. Rheological curves were determined for the conversion products and were used to show the change in the viscositytemperature characteristics.

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Keywords

Component composition of oil, Highviscosity oil, Iron oxides, Nanosized particles, Rheological curves